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STRATEGIES FOR MANAGEMENT USE AND SURVIVAL
OF MARKETING INFORMATION SYSTEMS:
A CASE HISTORY

A. Marvin Roscoe, Jr.
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#397

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1. The first part of the paper is devoted to a general discussion of the problem of the existence of solutions of the system of equations

$$\frac{dx}{dt} = f(x, y, z), \quad \frac{dy}{dt} = g(x, y, z), \quad \frac{dz}{dt} = h(x, y, z),$$

where

STRATEGIES FOR MANAGEMENT USE AND SURVIVAL
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A. Marvin Roscoe and Jagdish N. Sheth
(American Telephone & Telegraph Company) (University of Illinois)

ABSTRACT

This paper describes the evolution from a longitudinal consumer panel to the planned development of an integrated Marketing Management Information System. AT&T's ten years experience with centrally developed marketing information systems is reviewed. The rationale for development, problems of implementation and analysis and the lack of effective utilization are explored. Improvements are made and increased management usage is stimulated. Finally, the five-year plan for future development building upon this past experience is presented.

The purpose of this paper is to describe the process of development, implementation, management uses and applications as well as system survival of a Marketing Information System (MIS) within the context of a large business organization.

As most practioners know, the primary problems associated with MIS are not so much related to system development and implementation as they are to its systematic usage by management in their decision making process as well as the continual need to cost justify the value of the system. Many times a good MIS system in terms of management use will fail due to the same reasons and processes as the failure of a good product in the market place. This is caused by the lack of customer-oriented approaches in the design and development of the system such that the needs of amangement decision making and the characteristics of the system fail to converge.¹ Fortunately, some attempts are made to design user-oriented MIS systems as we gain more experience in this area of market research.

¹ J. N. Sheth, "The Future of Marketing Models", ESOMAR Congress, Venice, September 6-10, 1976.

While a good user-oriented conceptual framework is likely to enhance the chances of MIS being properly utilized by marketing management. Often, the problems of MIS usage and survival are highly determined by the nature of industry, competitive pressures, company's organizational structure and management attitudes and values. Given the specificity of factors that often make the difference between success and failure of a MIS system in the organization, it seems that the case history approach is a very useful way to assess and analyze the complexity and ad hoc characteristics of an existing MIS system.

Accordingly, this paper will focus primarily on the management uses and applications of MIS and how specific system changes are planned based on past experiences in order to fully integrate the system with the marketing decision making process within the company:

DESCRIPTION OF THE BELL SYSTEM

American Telephone and Telegraph Company, the Bell System, is a giant parent holding company having assets of more than 86.0 billion dollars which are owned by nearly three million stockholders. Its annual revenues were approximately 32.5 billion dollars which generated a net income of nearly four billion dollars last year. It is the largest single corporation in the U.S. in terms of assets, employees and annual revenues.

The primary business of the company is in the telecommunication industry. It services more than 120 million telephones and provides a vast, complex network for residence and business customers through the Long Lines Division and 19 regional operating companies. In the provision of these telecommunication services, it is regulated by the Federal Communication Commission (FCC) and the individual state regulatory agencies. Overall, the Bell System enjoys an excellent reputation as a well-managed corporation and its customers are generally well pleased with the service they are provided.

Historically, the Bell System has been a technology driven corporation. As a consequence, most of its resources were allocated to service reliability, mechanization, cost reduction, product improvement, and expansion into diverse areas of telecommunication business.

During the late 1940's and early 1950's the major efforts were focused on satisfying the tremendous pent-up demand for telecommunication services and the improvement of basic services. This resulted in almost every household having an individual private line and the ability to dial directly over the network to any other telephone.

When these objectives started to become a reality, the Bell System began to establish a Merchandizing Department which rapidly transformed into the early Marketing Organization. In the next ten years, many products and services were introduced which were based on styling, social and aesthetic

utilities, in addition to product performance utility. For example, colors were added to the telephone, stylish phones, such as, Princess and Trimline were designed and push button phones were introduced.

At the same time, substantial changes were taking place in the expansion and utilization of the telecommunication network. For example, private lines, private networks and Wide Area Telephone Service (WATS) were offered to business customers. Furthermore, it was anticipated that the future growth of the Bell System rested in stimulating long distance communication usage in both the business and the residence market. Mechanization and technological improvements continued to result in the reduction of rates to the consumer. Prices were reduced while some services were expanded with the cost to the user held constant. In 1967, reduced long distance rates were put into effect in an effort to selectively stimulate demand based upon price. This major policy of price differentiation was based on the type of call (direct dial versus operator assisted), on the time of day (peak vs. off peak hours, especially the evenings), and on the day of the week (working days vs. weekends).

It was this new price policy which led the corporation to plan for a marketing information system which would assess the impact of rate changes in both the residential and the business markets and to substantiate and justify the estimates of customer reaction that had been made before the FCC.

BRIEF DESCRIPTION OF MRIS

The responsibility of developing the Market Research Information System (MRIS) designed specifically to track the impact of rate changes in the long distance telephone market was assigned to the Management Sciences group within the Company. This was not an easy task. Traditional econometric methods could not be applied. At the time of the rate change, the total market was 3.6 billion dollars in annual revenue. The growth rate (10%) was three times the effect of the rate reduction and the service was characterized by extreme seasonality and high individual customer period-to-period variance.

The initial system was established in 1969 and was designed in terms of a longitudinal panel. It consisted of a national sample of 60,000 customers (30,000 residence and 30,000 business). The sampling plan was a multistage probability sample with the basic frame being one hundred regional accounting offices from which monthly bills were sent to the customers of the Bell System. Each revenue accounting office (RAO) which covered a specific geographical territory of the country was further broken down into 24 central offices (CO), and a systematic sample of 300 business and 300 residence customers was established after removing several categories of ineligible customers, such as, special services and coin telephones.

There are several advantages and unique features associated with the Market Research Information System panel. First, the population is well-defined in terms of individual billing accounts corresponding to the unique telephone numbers. This enables the researcher to easily draw a representative sample even with relatively low random drawing probabilities. Second, there is no need to seek cooperation and recruit and maintain a panel since the data are directly obtained from the monthly billing records. Third, there is relatively very small degree of measurement error since all the telephone calls generating revenues are automatically recorded for billing purposes. Thus, the quality of information is extremely good and in general, has very low non-sampling errors as compared to other longitudinal panels. Finally, it is relatively easy to maintain the representativeness of the panel over a period of time by proper replacement sampling procedures which do not get contaminated with the problems of recruiting, training and maintaining voluntary panel members.

The total data bank consists of recording many different types of telephone equipment and services subscribed to by the customer. There is a complete description of the telephone equipment in the possession of each panel member and monthly revenues derived from its usage. Each long distance call made by the panel member is separately recorded in terms

of length of conversation, distance of communication, the time of day, as well as the type of call made. These are the factors that determine the price of each long distance call made by the panel members.

In addition to the behavioral information available from the billing records, a mail survey is conducted with the residential customers. This survey collects information about each panel member's housing, demographic and mobility characteristics, family composition and attitudes toward the use of telephone service.

A computerized system for storage and retrieval was implemented soon after the design of the sample. It consists of receiving monthly data from each RAO on a tape and combining these hundred monthly tapes into a master file system on seven disks. At the same time, data is stored on individual disks for each revenue accounting office which is capable of accumulating twelve months of information. The initial storage and retrieval system was designed for an IBM 360 (Model 65) computer. However, the amount of information to be stored on a cumulative basis since the inception of the system has required many substantive changes. The computer sub-system is mentioned briefly because of the difficulties caused by this initial data access methods and the storage space required for the fixed length records.

THE BASIC PROBLEMS

A number of fundamental problems resulted in the lack of effective utilization of the information. While MRIS had a wide range of customer data not readily available for management purposes, several factors combined to make the system difficult to manage and unresponsive to management needs.

The design of the data base and the computer programming were performed by the Management Sciences Department and not the user organization. The Management Sciences Department had considerable professional skills which unfortunately were not perceived to be useful to the marketing management. For example, interest centered on the building of complex mathematical models for forecasting revenue which managements could neither understand nor consider necessary as alternative forecasting procedures already existed within the corporation.

The data resident in the data base was a broad assemblage of information describing individual customers. Before the individual data items could be extracted for analysis, considerable effort was necessary to become familiar with the data and to prepare extracted files for analysis.

The computer system and the data base design required large scale storage capacity and frequent mounting of disks for analysis. The access methods were state of art; however, because of the data base structure, extractions were frequently

complex and used considerable central processing unit time. This arrangement was susceptible to hardware and software malfunctions causing data destruction. The recovery procedures were complex and frequently extended over many months. In fact, the system looked primitive in light of the enormous quantity of data. These considerations resulted in a very expensive system that needed lengthy intervals to extract and analyze data.

While this new information system created sizable problems for the researcher, further complications arose because the information system's capabilities were not understood and thus not effectively applied to the corporation need for marketing information and analysis. Management generally found the system to be mysterious and did not wish to disrupt their existing methods and procedures with an unknown and untested system. Thus, when corporate studies were generated from MRIS, the operating companies were unwilling to implement these studies on a local basis. It was apparent from the beginning that MRIS had not been integrated into the marketing process.

Finally, technical problems surfaced regarding the sampling plan which caused an already dubious management to begin to seriously question the viability of the system. While the sampling plan was very good for national estimates, the management requirements tended to be regional since each operating company had an autonomous decision-making function

responsible to the state regulatory agencies. When the data were disaggregated for individual companies, the sample sizes were not large enough nor representative of the regional population to satisfy management's needs for information. This was further compounded by the fact that the regional regulatory agencies required certain statistical inferential procedures for approving rate changes which could not be met by the MRIS system.

The culmination of these fundamental problems was the serious consideration of whether the system should be continued or dropped during the early stages of its development. Fortunately, MRIS was given a reprieve. A set of strategies was developed and their successful implementation resulted in a vastly improved system. The survival strategies that follow evolved over a period of time and while all of them were never formally committed to paper, the managers of the project who had drawn upon outside consulting expertise knew what was necessary and had an informal plan to insure system viability.

STRATEGIES FOR SYSTEM SURVIVABILITY

The underlying objective was to develop the system such that it would be perceived to be useful and in turn utilized by marketing management in their planning and decision-making process. Four major strategies evolved and three subordinate strategies were developed to support the rebuilding

activities. These later strategies dealing with organizational responsibilities, computer systems and data base design and panel sampling procedures performed the enabling functions and were essential to the success of MRIS, but were not sufficient to guarantee success by themselves.

The lack of effective knowledge and understanding of MRIS was inhibiting its acceptability to management. There was a very clear need for the dissemination of existing information. This dissemination function had to be user oriented. The primary task of the dissemination team was to assess the needs of marketing managers among the operating companies and develop publication programs with which to communicate with them. Basically, this required a change in attitude and system mission in terms of processing and summarizing information in a non-technical way and establishing a program of aggressive education which would demonstrate the latent value that MRIS possessed. Experiences encountered on implementing such a program are described by Ellis.² A national meeting was held to present to the representatives of the operation companies the developmental status, the demonstrable results achieved to date and the plans for the future. This meeting was followed up with a series of newsletters, reports and general letters. Since effective communications are so vital, these activities continue today.

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Richard B. Ellis, "Harnessing Pegasus: The Management of Multivariate Analysis", Marketing in Turbulent Times and Marketing, the Challenges and the Opportunities; 1975 Combined Proceedings, Serial No. 37, edited by Edward M. Mazze, American Marketing Association, 1975.

A related approach was to link specific market research requests from operating companies to the MRIS data base. It was found that there were many areas of market research, such as, tracking the impact of rate changes, promotional programs, and individual customer analysis for which there was no parallel to the longitudinal panel approach provided by MRIS. Furthermore, since the same type of research requests often come from different operating companies, it was possible to build upon these individual studies to create a general study solution utilizing the existing data bank and provide other companies market analysis in a more efficient and rapid manner.

Next, an extensive research effort was mounted directed toward fundamental or developmental research related to improving the professionalism of the research supervisors as well as the technical capability of the organization in the market research area. This covered the full spectrum of data collection, data analysis and dissemination of information. For example, several studies were carried out to learn more about the art of mail surveys in terms of question wording, format aspects, question length, scale reversal effects, etc. Similarly, several new statistical programs were installed and tested and made available to the research staff. Finally, sufficient analytical skills were developed to have internal strengths on which the operating companies can rely for advice and assistance.

Finally, and the most critical factor in terms of system survival was the development of problem-oriented market research studies based on the MRIS data. The underlying presumption behind this strategy was that marketing management either could not or would not take time and interest to systematically utilize the MRIS data base in its problem-solving situation. Therefore, it was necessary for the market research staff to assess the present and anticipated marketing problems the company was likely to face, and attempt to demonstrate that at least good insights and directions toward their solution could be achieved by the proper utilization of MRIS. Several of these applications will be discussed in the following section.

The organization incompatibilities were resolved by moving the systems responsibility to Marketing. A second group was established to provide the interface between the information system and the marketing user, development of the fundamental research and the application of the MRIS data to marketing problems. This brought under one organization those responsible for specifying the marketing analysis and those responsible for processing the data to meet the study requests.

The computer sub-system was completely overhauled and enhanced. The computer facilities were upgraded to an IBM 370, model 158. The principle improvement was the implementation of

IBM's Information Management System (IMS). This data base management system utilized variable length records and provided the ability to access any level of data within the hierarchical structure quickly and efficiently. Larger storage disks eliminated the frequent problem of mounting and remounting disks and the new procedures resulted in effective coordination between the systems group and the computer operations people.

A new sampling plan was proposed based upon specific geographical areas of interest to the operating companies. These defined the new sampling frame and replaced the previous RAO's within each geographical area. Random sampling replaced the clustered systematic sampling. Thus, all customers within each area had an equal probability of appearing in the sample. This eliminated the possibility of certain areas not being representative. A rotation scheme was implemented that systematically replaced 1/8 of the panel every six months. This kept the existing panel from aging. The additions to the panel insured that bias was not setting in and that there was no drift away from unbiased population estimates.

APPLICATIONS

Market Segmentation Analysis

Applying the Automatic Interaction Detector (AID)
3 program, the residence long distance market was segmented using

3 For a similar example, see A. Marvin Roscoe, Jr. and Jagdish N. Sheth, "Demographic Segmentation of Long Distance Behavior: Data Analysis and Inductive Model Building", Proceedings 3rd Annual Conference, Association for Consumer Research, edited by M. Venkatesan, 1972.

demographic and telephone equipment variables. The demographic and equipment profile was obtained by a mail survey of the panel members as mentioned earlier.

The AID analysis identified six broad market segments. They are summarized in Table 1. As would be expected, the demographic characteristics, income, age, education and socioeconomic status as well as a number of additional phones (extensions) came out as the strongest variables in explaining the differences in average, monthly long distance bills from customer to customer. The range of variability was between \$2.28 among the older, lower socioeconomic class and \$9.13 among the people earning more than \$15,000. This represents a ratio of at least four from the lowest to the highest segment.

This segmentation study subsequently evolved into a market potential study when the same segments were compared across geographical areas identifying markets with below average consumption patterns. The analysis was combined with comparative information about long distance calling to identify product usage deficiencies. A successful test was conducted in one operating company and the advertising effect was tracked using MRIS. This activity was so successful that the following year a corporate wide marketing effort was implemented within each of the operating companies. Over 290 million dollars of verified annual revenue can be attributed to this program.

Product Potential Models

A second area of marketing applications has been to develop market potential for several telephone instruments including the Touch-Tone (pushbutton) telephone, extension phones and other premium sets such as the Princess and Trimline phones with the use of multiple discriminant analysis.

The residential extension telephone market will be used to illustrate this concept. Based on the existing extension purchases, the total sample was divided to create groups of customers with no extensions, one extension, and two or more extensions. A three group discriminant analysis was performed in which the demographic and telephone profiles of the individual customers were utilized as the independent discriminating variables. The resultant discriminant functions were used to calculate each individual's discriminant scores and to predict his membership probability to each of the three groups. The basic proposition is that the misclassification of no extension customers to one or more extensions, and of one extension customers to more than one extension customers constitute the additional potential market.

The classifications shown in Table 2 illustrates the areas of potential market development. The total market was further divided into four segments utilizing AID analysis to identify the specific demographic characteristics of the

selected market areas having the highest market potential. A summary is shown on Table 3. The study demonstrates that in addition 7.5 million extensions could be sold yielding 100 million dollars of annual revenue and identifies the most profitable segment in which to concentrate promotional effort.

Identifying Market Clusters and Test Markets

A common marketing management need is the identification of similar markets for test marketing and comparative analysis purposes. If there are several comparable markets in terms of the benchmark variables, such as, demographics, market revenues, etc., it is possible to conduct advertising and new product experiments on a scientific basis.

The research program anticipated this need for and developed a cluster of the basic one hundred revenue accounting offices (RAO's) based on the average demographic and telephone profiles of the sampled residential customers. A total of 65 variables were utilized in developing a market classification of RAO's. The first step was to reduce the 65 variables to their underlying dimensions by the use of principle components analysis. Ten factors were obtained which summarized 92 percent of the total variance. The profile scores were then converted into factor scores, and the RAO's were clustered utilizing the Johnson⁴ Hierarchial Clustering Algorithm.

⁴
A. Marvin Roscoe, Jr., Jagdish N. Sheth and Welling Howell, "Intertechnique Cross-Validation in Cluster Analysis", New Marketing for Social and Economic Progress and Marketing's Contributions to the Firm and to the Society; 1974 Combined Proceedings, Serial No. 36, edited by Ronald C. Curhan, American Marketing Association, 1974.

The results are reproduced in Table 4. Most of the clusters had face validity. However, in order to ensure that the clusters were not created by the specific technique utilized, a cross-validation was performed by using another clustering technique on the same data, and cross-tabulating the two results.

This classification of market areas into homogeneous types has become a standard reference in the company for future test market studies in the residence market.

Market Impact Analysis

A fourth area of marketing applications to which the MRIS system has been utilized is the measurement of market impact at the individual customer level. As a longitudinal panel, MRIS is ideally suited for assessing changes in market response due to marketing efforts such as rate changes or promotional campaigns.

The market impact analysis is illustrated with a rate change study reported by Assael and Roscoe.⁵ Residence customers who met the following conditions were selected from the MRIS panel. First, they must have a twelve-month history before and after the rate change with respect to long distance

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Henry Assael and A. Marvin Roscoe, Jr., "Segmenting by Consumer Responses to a Change in Marketing Stimulus: A Segmentation Analysis of the Long Distance Telephone Market", XXVIII ESOMAR - Congress, Montreaux, Switzerland, 1975.

calls to measure shifts from weekday to off-peak hours and from operator handled to direct dial calls. Second, they should have complete demographic and telephone profiles. Third, they must be relatively homogeneous in their usage patterns.

Each customer's average monthly bill before and after the rate change was calculated as an index of rate impact. This amounted to an average of \$0.56 for the total sample. However, a demographic breakdown of the total sample clearly indicates that there were significant differences among various demographic groups suggesting that not all people react to the same extent given a particular rate change. As summarized in Table 5, it is interesting to note that the highest impact was among the married families, among clerical and sales occupations, among under 35 years of age heads of households, among renters of homes and among those who had lived two years or less at their present address.

The analysis of market impact has been extended to numerous rate changes and promotional campaigns. This general form of trend analysis and tracking has been applied to both the business and residence markets and the example of long distance promotion under the previous market segmentation application is an excellent example of this capability.

NEW DIRECTIONS

In 1973 a newly reorganized Marketing Department was created. Market Management responsibilities were established for the Business and Residence Markets and the role of Product and Service Management was redefined and expanded. Coincidental with these organizational changes a marketing process was proposed that defined the roles of the individual divisions in coordinating the marketing effort to satisfy customer needs and wants.

To properly serve the needs of these marketing functions, new marketing information systems were required. Systems were designed and implemented that provided descriptions of the market place and the customers who purchase specific products, measurements of the market development, market penetration and sales effectiveness and analysis of specific marketing programs.

To handle this dramatic growth in information systems activity, a Marketing Information Section was formed as a separate entity out of the Market Research Organization. New activities for planning, revenue forecasting and analysis and results measurements were incorporated in the marketing information responsibilities.

With this change, the Marketing Department assumed the sole responsibility for the corporate generation of revenue.

This included an expanded role in the forecasting of revenue, negotiating revenue commitments with the operating companies and the measurement of results in achieving the revenue growth. To properly coordinate these departmental and corporate activities a marketing planning coordinating function was established consistent with and integrated into the corporate planning process.

FUTURE PLANS

This expanded role demanded a pause for reflection. Where were we in the Marketing Information game and where did we want to be out into the near future. The new planning process could easily be modified for this task.

Assumptions were formulated as they related to the marketing information responsibilities. These encompassed the corporation, the Marketing Department, other Departments at AT&T and the anticipated state-of-the art for personnel sub-systems and computer sub-systems. These were used to define the environment in which the development of marketing information systems would proceed.

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The aim of marketing information was stated as follows: to develop and maintain marketing information systems and procedures designed to assist managers directly in the planning,

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A. Marvin Roscoe, Jr. "Marketing Information - Five Year Plan", Internal corporate document, November 12, 1976.

policy formation, decision making and marketing effectiveness measurement processes.

Nine specific goals were articulated that were conditioned by our past experience and a quasi ultimate information system design as proposed by Montgomery and Urban.⁷ A diagrammatical display of this decision-information system structure is shown in Table 6.

Generally stated the goals covered the following areas: consolidating information requirements, centralizing the development and implementation of systems, integrating existing and planned data bases, improving the detail and quality of data, improving the timeliness of responses to requests for information, removing data redundancy, designing systems to be cost effective and expanding the analytic and model building capabilities as an integrated part of information systems. Specific objectives obtainable within the five year planning period were developed along with a strategy for accomplishing these objectives. A diagram of the function responsibilities can be seen in Table 7.

7

David B. Montgomery and Glen L. Urban, "Marketing Decision - Information Systems: an Emerging View", Marketing Information Systems-Selected Reading, edited by Charles D. Schaver, American Marketing Association, 1976, pp. 22-30.

CONCLUSION

The authors believe that marketing information systems must be designed to meet the unique needs of an individual corporation and must conform to and exist within that corporate environment. One such information system with a wide range of experiences and a lengthy period of existence so as to be of interest to MIS practitioners has been presented. Sharing these experiences can help others plan for the successful implementation of new systems while others can be encouraged to revitalize and reestablish existing systems.

TABLE 1

LONG DISTANCE MARKET SEGMENTS

		<u>Average LD Bill</u>
All customers		\$5.60
Group 1	Income above \$15,000	\$9.13
Group 2	Income below \$15,000 One or more extensions Attended college	\$7.33
Group 3	Same as Group 2 except High School Graduate or less	\$5.37
Group 4	Income below \$15,000 No extensions Upper middle class	\$4.90
Group 5	Income below \$15,000 No extensions Lower middle and lower class Age 54 and lower	\$3.73
Group 6	Same as Group 5 except Age 55 and above	\$2.28

TABLE 2
MARKET POTENTIAL CLASSIFICATIONS

		<u>Predicted by Discriminant Analysis</u>		
		Zero	One	Two or More Extensions
<u>Actual</u> <u>Market</u> <u>Development</u>	Zero	-	Potential Market	Potential Market
	One	-	-	Potential Market
	Two or More Ext.	-	-	-

TABLE 3
SOURCE OF ADDITIONAL EXTENSIONS
(000)

	<u>Zero Ext. Customer</u>	<u>One Ext. Customer</u>	<u>Combined Total</u>	<u>Yield Per 100 Customers</u>
Segment 1	1,400	1,100	2,500	45
Segment 2	3,100	900	4,000	26
Segment 3	400	150	550	8
Segment 4	400	50	450	3
Total	5,300	2,200	7,500	18

<u>Market Segment</u>	<u>Definition</u>	
	<u>Rooms</u>	<u>Income</u>
1	6 or more	\$15,000 or more
2	6 or more	below \$15,000
3	5 or fewer	\$10,000 or more
4	5 or fewer	below \$10,000

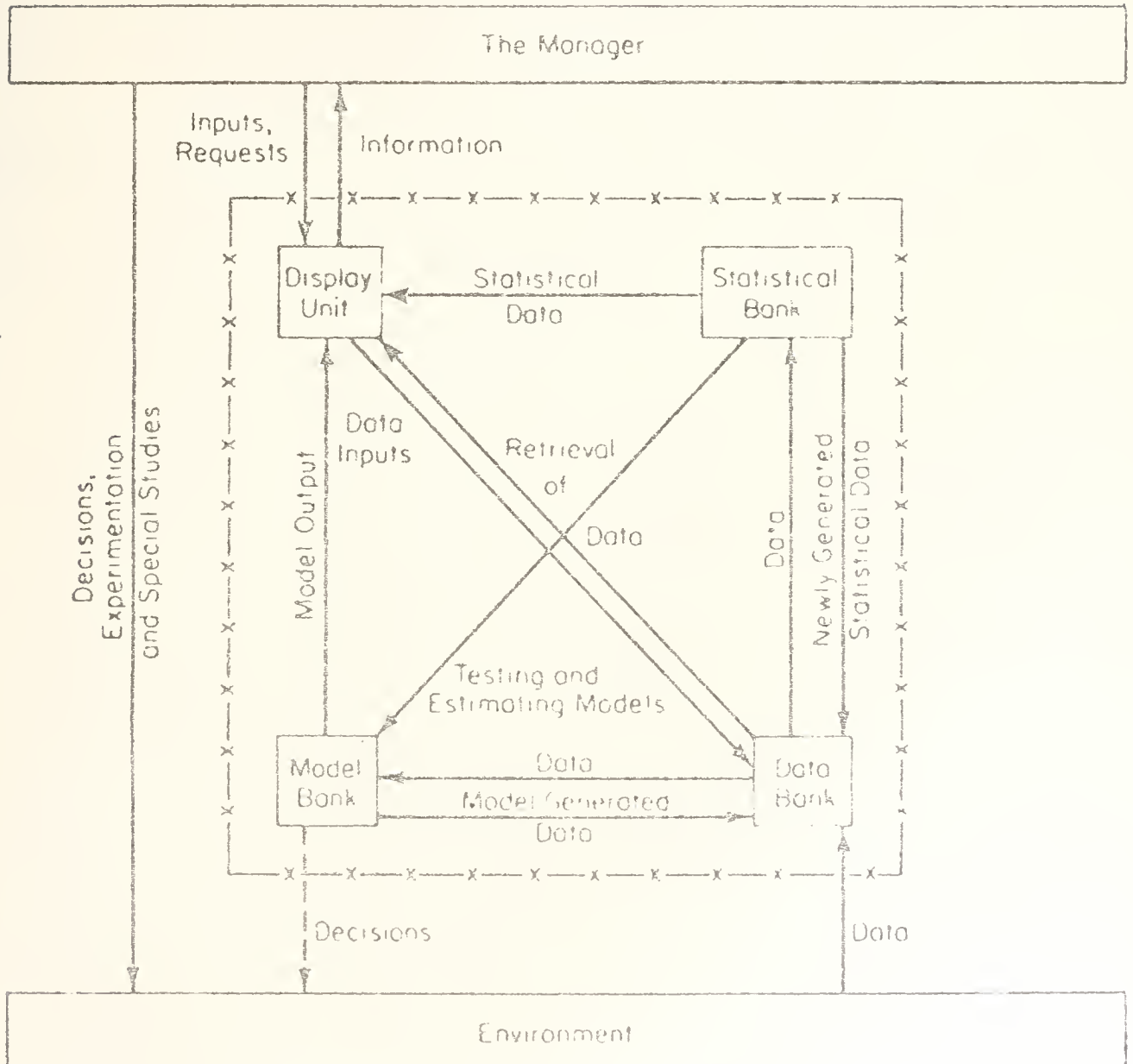
TABLE 5

CHANGE IN AVERAGE MONTHLY LONG DISTANCE
BILLING BY KEY DEMOGRAPHIC CATEGORIES

<u>Demographic Category</u>	<u>Avg. Increase In Long Distance Bill</u>	<u>Category Represents This % of Sample</u>
Total Sample	\$0.56	100.0%
<u>Stage in Life Cycle</u>		
Younger married with no children or younger married with one or more children over 13 years	\$1.01	40.8%
Younger single or married with children under 12, or older married and single	0.25	59.2
<u>Type of Occupation</u>		
Sales, Clerical or Operative	\$1.00	20.6%
Manager or Professional	0.72	33.2
Blue collar, Homemaker, or Unemployed	0.24	46.2
<u>Age of Head of House</u>		
Under 35	\$0.99	17.3%
35-54	0.64	45.4
55 & Over	0.28	37.3
<u>Own vs. Rent Dwelling</u>		
Rent	\$1.02	18.7%
Own	0.45	81.3
<u>Length of Residence</u>		
Two years or less	\$0.76	19.9%
Three to fifteen years	0.56	50.1
Over fifteen years	0.43	30.0

TABLE 6

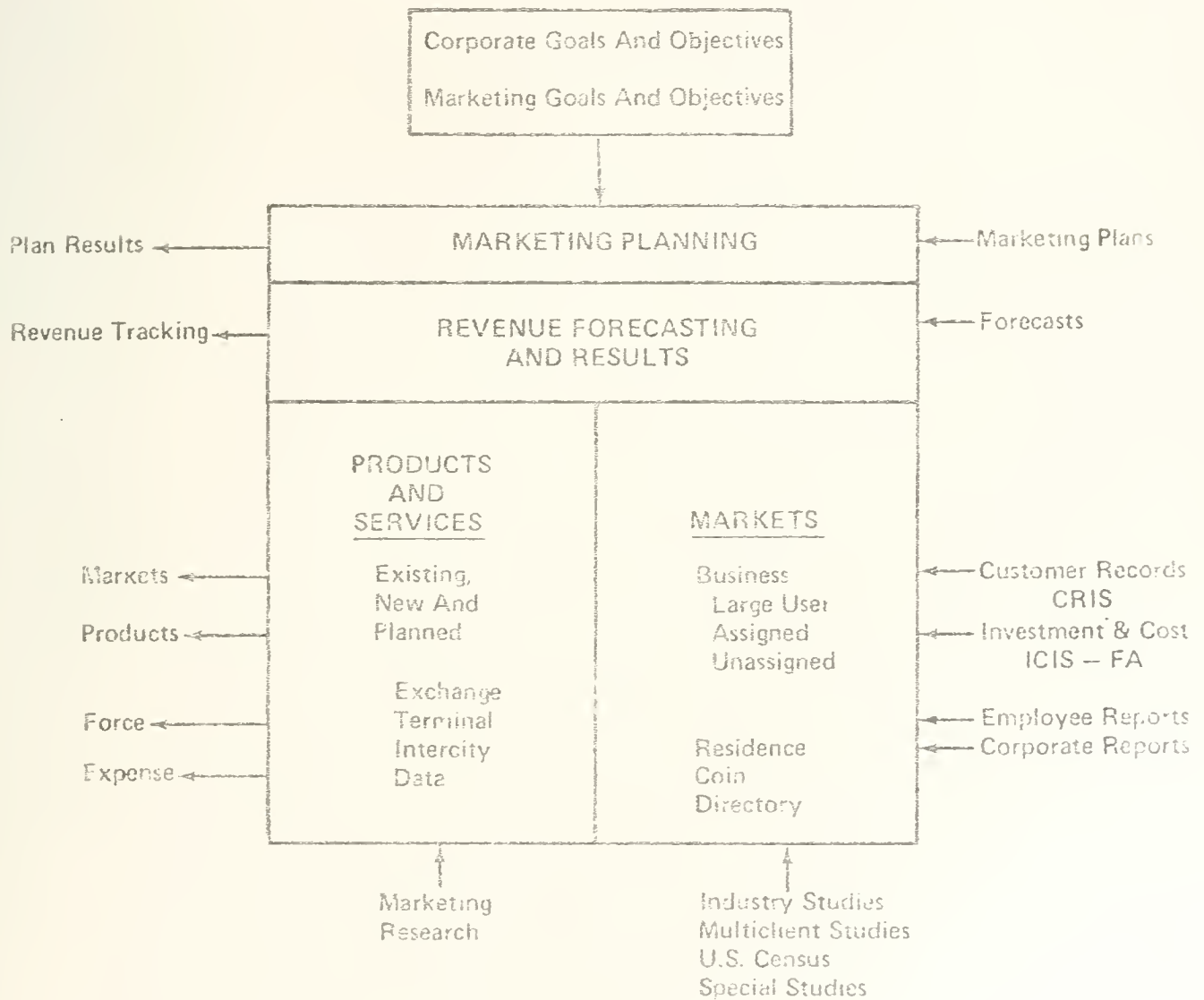
DECISION-INFORMATION SYSTEM STRUCTURE



Information System Boundaries — x — x —

TABLE 7

Marketing Information Systems Functional Responsibilities





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